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ABSTRACT

While its educational goals were yet to be defined, the aims of the radio in the early 1920s included the social goal of cultural pluralism; the economic goal of profiteering; the military goal of communicating, training, and surveillance; and, the political goal of propaganda and morale building. In the end, like previous technological advances, the purpose of educational radio was concealed by the prominent role of the radio's usefulness as a tool of efficiency and entertainment. That is, the utility of an innovation for its consumers ultimately determines its survival. This paper seeks to uncover the actual uses of educational radio from its inception to the mid 1940s. The paper traces the development of radio, particularly educational radio, through the history of its initial decades. It focuses on the story of WKAR, the third oldest radio station in the state of Michigan. The paper tells the story in four parts: (1) the creation of WKAR in the 1920s; (2) WKAR during the golden age of radio in the 1930s; (3) the beginning of the end of educational radio in the 1940s; and (4) WKAR today. It concludes that the introduction and use of the radio in education and in society as a whole had a deep yet short impact. Appended are charts and information about programming on educational radio stations. (Contains 19 notes and 43 references.) (BT)

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INTRODUCTION

"It is tempting to assume that simply introducing new technologies into schools will transform educational practices" ~ Larry Cuban

Mechanisms of all sorts have been introduced to assist the teacher in teaching children. From the physical mechanisms of the straight back desk and the leather strap to the printing mechanisms of the New England Primer and the McGuffey Reader to the electronic mechanisms of radio, film, television and computers to the current mechanism of accountability of standards and assessments, these instruments have the purpose of reconceptualizing teaching and learning. While its educational goals were yet to be defined, the aims of the radio in the early 1920s included the social goal of cultural pluralism; the economic goal of profiteering; the military goal of communicating, training and surveillance; and, the political goal of propaganda and morale building. In the end, like previous technological advances, the purpose of educational radio was concealed by the prominent role of the radio's usefulness as a tool of efficiency and entertainment. That is, the utility of an innovation for its consumers ultimately determines its survival. The purpose of this paper is to uncover the actual uses of educational radio from its inception to the mid 1940s.

The Birth of Radio

Who would promote and appreciate the advancements the radio professed? And, what factors would conspire to determine the role of the radio in the United States circa 1920? If radio were idealized as the conveyor belt of ideas, information and values, private entrepreneurs would be the pulley system that made the radio accessible to the public. In November of 1920, KDKA in Pittsburgh and WWJ in Detroit broadcasted the Warren G. Harding (R) - James Cox (D) presidential election results as a stunt to scoop newspaper coverage (Cremin, 1988). Overnight, radio waves had inundated the skies. A year and a half after the broadcast of the Harding

election, 500 commercial stations had been created. The Department of Commerce licensed 345 stations in the first six months of 1922 alone[1]. The development of the 1000 watt transmitter dramatically increased the power of transmission. In order to keep up with the demand of this new form of communication, manufacturers made 100,000 radios in 1922. The invention of the high vacuum tube in 1925 drove the price of radios downward. As a result, by 1934 1.5 million radios were being produced yearly (Cremin, 1988, P. 348).

In 1923, President Hoover convened the second Radio Conference to discuss regulation of the radio (Cremin, 1988, P. 349). Hoover wanted the industry to self-regulate without government interference. This decision paved the way for the partnership of radio and advertising. Cremin pointed out that at this point the "advertiser became the client and the listener merely a consumer" (Cremin, 1988, Pp. 350-1). Sponsorship sales soon exceeded $350 million a year.

These large amounts of money were too great for big corporations to pass up. In 1926 The Radio Corporation of America, General Electric and the Westinghouse Corporation created the National Broadcast Company (NBC). Two years later the Columbia Broadcast System (CBS) was established (Spring, 1992). In 1927 the government created the Federal Radio Commission (FRC) to grant licenses. Additionally, the FRC also had censorship power that was seldom utilized. A limited number of national broadcasts also became available. Radio in the late 1920's was marked by the broadcast of Lindberg's first solo trans Atlantic flight (1927), Herbert Hoover's Presidential win (1928), syndication of Amos n' Andy (1928) and the first broadcast of the Rose Bowl in 1927[2]. Everything was in place for radio to have a great impact

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[1] In 1922 two stations in the state of Michigan were granted licenses: WWJ in Detroit and WREO (Reo Motor company later to become Oldsmobile) in Lansing.
[2] Alabama 7- Pittsburgh 6.

on American society in the 1930s. A plethora of stations had strong financial support, consumers were eager and willing to purchase new low cost radios, and the government was content with its seat in the audience. It was these actions that marked the explosion of radio and the dawning of the "Golden Age of Radio" in the 1930s.

The Golden Age of the Radio

The early 1930s was both marked and marred by the Great Depression. Over 16% of Americans were unemployed. In the midst of bank closures, people were still listening to and buying radios. By 1932, 12 million of the 30 million households in the United States had radios while 2.4 million radios had been produced and 604 commercial stations transmitted signals (Spring, 1992). It was the radio that helped people gather information and escape the harsh realities of their times. Columbia Broadcast System President William Paley stated in 1934, "Radio programs had to appeal to the emotions and self-interest of listeners, as well as their intellect" (Spring, 1992, p. 105). Thus, "the golden age of radio" was marked by the hunger for real-time news and escapism (see Appendix for a sample of radio programming in 1939). Finally, the average American listened to 4.5 hours of radio a day in 1937 (Spring, 1992).

This fascination with real-time audio was ritualized by the broadcasts of President Franklin Delano Roosevelt. Roosevelt began regular broadcasts beginning in 1933 when he declared plans to re-open banks. Roosevelt's addresses to millions nationwide became so common and soothing Americans would gather as a family to listen. These presidential addresses became known as "fireside chats." Americans also listened to nightly newscasts about world issues. The voices of news and commentary in the 1930's included Lowell Thomas, H.V.

Kaltenborn, Walter Winchell, and Edward R. Murrow[3]. Additional live radio events in the 1930's included the 1930 speech of King George V opening the Five Power Naval Conference which was aired live and the Hindenberg crash covered live on the air in 1938.

Entertainment programs that dominated the Golden Age of Radio included: Sherlock Holmes, Little Orphan Annie, Dick Tracey, The Lone Ranger[4], Buck Rogers and Roxy and His Gang. Variety shows of Jack Benny and Burns and Allen debuted in the 1930's as well. Guy Lombardo and Paul Whiteman were popular hosts of orchestras on the air. Kate Smith and Bing Crosby were the major vocalists. Live entertainment productions also began to fill the airwaves. In 1930 "Der Linderflug" a musical of Lindberg's flight aired from Germany. The first opera[5] was broadcast in 1931 from the Metropolitan Opera House in New York City as well as "Live from Radio City Music Hall" with Rudy Vallee and Will Rogers. Finally, Orson Wells' dramatic and controversial broadcast of H.G. Wells' "War of the Worlds" in 1938 unleashed a great debate and a call for the censorship of the radio. The interplay between government power, private enterprise and advocacy groups began to be debated in the public. The Communications Act of 1934 changed the FRC to the Federal Communication Commission (FCC). Shortly thereafter, censorship began. In 1937 the FCC began censoring radio after Mae West's sexy repartee with the wooden dummy "Charlie McCarthy" on the *Chase and Sanburn Hour* (Spring, 1992).

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[3] Murrow began nightly broadcasts from London in 1939 signing off each evening with "Good night and good luck." This became a comforting mantra in a turbulent era.

[4] The Lone Ranger originated and debuted from WXYZ in Detroit in 1933.

[5] *Hansel and Gretel*

Tarnishing the Golden Age

In 1935 the FCC encouraged stations to regulate themselves and satisfy entertainment for children or else "the government must apply the whip" (Spring, p. 114). Society began to voice the negative effects of radio, namely violence. Women and parent groups had influence over programming because of the number of daytime listeners of soap operas. An example of programming mothers rebelled against was "The Shadow." Specifically the opening irked many parents because they believed the script, "Who knows what evil lurks in the hearts of men? The shadow knows" scared children (Spring, 1992, P. 112). As a result, the show was pulled from many stations due to pressure from sponsors who feared losing their important female audience. While mothers had influence on commercial radio, African American objections (i.e. *Andy n' Amos*) went unheard[6]. The FCC also developed limitations on advertisers. For example "lotteries, fortune tellers, racing tips, blood and thunder kids' programs, birth control compounds and fat removing compounds" were banned from the radio (Variety, May 8, 1935). Radio supporters countered the censorship:

> If the fight against radio were merely a question of who could out-hypnotize Washington, radio could probably take care of itself... anti-radio elements are going over the heads of the politicians to the people via the constant stirring-up of clubwomen, mothers, teachers, churchmen, etc.... Radio has been blamed for everything from dust storms to the failure of Americans to buy as many shoes as formerly. Now police dockets and missing person's statistics are presumably to be laid at the feet of the microphone.... Censorship of radio is what enemies of the industry want... [The radio's] chief offense has been against good taste rather than morals... [We] should fight to allow unctuous phrases like 'decency' to be used (Variety, May 15, 1935).

Thomas Rishworth, KSTP educational director, responded to parent-teacher association complaints against his station. His article responding to the complaints begins with a line that

[6] This was a result of a number of issues. Economically, Black Americans did not have the same purchasing power as women. Additionally, racial prejudices were deeply rooted in the American culture, institutions, and laws.

encompassed the ridiculous nature of parents' concerns, "kids wake up in their sleep trying to sidestep that withering death ray. They sneak deeper under their coverlets to escape some radio meanie's blue-steel scimitar" (Variety, December 18, 1934). While radio survived previous parental attacks and governmental censorship, radio was dealt a blow to its monopoly by the FCC in the early 1940's. Until 1943, NBC ran a Blue and a Red network. The government forced NBC to break its monopoly and it sold off the Blue network to the American Broadcasting Company (ABC) (Spring, 1992).

It was believed that radio provided and advanced the general knowledge of its listeners. The battles between radio broadcasters and listeners were far from over. Because radio was the most constant and pervasive form of generalized education through a medium other than school, other institutions would soon enter the arena. Soon college and university educators began to make formal educational claims in order to carve a niche in this emerging market.

THE CLAIMS OF THE RADIO IN EDUCATION

> "We are prone to make each new medium into a vehicle for entertainment before the pangs of conscious and the yawns of boredom and satiety force us into a second look."
> ~Atkinson & Maleska, 1962

Radio's popularity in American society was also prevalent in educational rhetoric. The Commonwealth of Pennsylvania Department of Public Instruction (1939) stated, "The school, the library, and the newspaper are usually ranked as the three great educational agencies. The radio promises to take its place as the fourth" (P. 2). Radio was visualized as a new medium to infiltrate and reconceptualize teaching and learning. Because American schooling was still in its infancy, educators were wrestling with the contending purposes of differentiated education and cultural pluralism. David Cohen (1988) stated, "Since World War II, educators, reformers and school critics have seized on one technical innovation after another, seeking fabulous opportunities for better education in each" (P. 232). And, when this was contextualized in the

growing Deweyan movement of creating a progressive, experiential educational experience, schools were ripe for a technology that was declared more effective and engaging. Could the radio replace the teacher? Would radio change the way information was passed on from teacher to children? Would the radio become textbooks on the air (Cuban, 1986)? Would radio be accepted, rejected or modified in the classrooms (Tyack & Cuban, 1995)? The only certainty in this era of educational dynamism was the understanding that something or someone had to pass along knowledge in order for students to advance. That is, "The didactic object, system and graduation are the necessary elements and distinguishing characteristics of all education, they are its sine qua non" (Clausse, 1949, P. 11).

It did not take long for educators to become fluent in the use of the radio. Larry Cuban (2001) introduced a technology syllogism, "change makes for a better society; technology brings about change; therefore, technology makes for a better society" (P. 29). Thomas Edison held the radio as an example of Cuban's reasoning when he stated that the use of textbooks was 2% efficient while the use of radio would be 100%. Would the radio make a better society because it was more efficient than textbooks? And, what constitutes educational efficiency?

The definition of educational efficiency within the context of the radio is twofold. First, American ingenuity has always held up making life easier as a function of any new technology. That is, the addition of a new technology must add a new flare to a current teaching fare. The birth of the radio paralleled the scientific management movement led by Frederick Taylor. If radio could give information to students faster than a teacher could disseminate information, it would be deemed a success. Second, the radio added a new *flare* to the *fare* of the learner. A new learning and thus teaching modality was added. Levenson (1945) stated the radio "can enable many to hear the best" (P. 16). That is, auditory learning strategies of reading aloud,

choral and individual response, and lecturing had a new stable mate, "Here is where radio can be of great help to the teacher, for radio has learned to use drama and music, two potent forces for creating emotional impact" (Levenson, 1945, P. 8).

I. Keith Tyler, director of radio education at the Ohio State University stated in the preface of Levenson (1945), "Scattered here and there throughout the country are individual classrooms, single schools and entire school systems which have realistically accepted the fact of the radio and its tremendous influence and have adjusted the curriculum, teaching processes, and even administrative practices to take full advantage of this powerful learning aid" (P. v).

While society called for the infusion of the radio into the educational setting, it was the teacher herself who had to actualize its use. "It is an established fact, and probably a disturbing one, that the average American school child spends two and a half hours a day… listening to the radio… How can the child's natural interest in radio be used to further his educational growth" (Levenson, 1945, P. 5)? Educators were sent on a quest to find and utilize the affordances of the radio in the classroom. Clausse (1949) revealed just how daunting of a task adding a new technology seamlessly into a classroom can be. Clausse outlined the rules or subjects that can be taught with radio as:

- Those with meticulous, precise and methodical teaching will be excluded.
- Those with thought and reflection during the broadcast should be excluded.
- Those that will suffer little from teaching and learning in a depersonalized and collective manner
- Use the radio to teach only what the teacher cannot (Pp. 46-8).

Despite these parameters the radio still provided educational affordances. First, the radio could retrieve previously unattainable information. That is, if the classroom could not go to the source of *information*, the radio could bring the source to the geographic hinterlands. Second, the radio offered a new dimension of *representation* of information for educators. The radio

afforded the listener the auditory opportunity to create mental images. Finally, educational radio claimed the ability of *transformation* of current teaching practices. In other words, radio would revolutionize the role of the teacher. In fact, if used to its potential the radio would make the teacher obsolete. The claims or affordances of educational radio, information, representation and transformation, will be the focus of the remainder of this section. The first two affordances focused on the learner while the last affordance is teacher oriented.

Affordance of Information

The development of electronic technologies (radio, film, television and now computers) has afforded people with real-time information. Levenson stated (1945), "Radio was used recently by schools... to combat a spreading danger from rabies... in launching salvage drives, in disseminating information concerning rationing, and ... serving as an air-raid alerting system" (P. 7). Information could be quickly disseminated over an expansive land. For educators, this meant the absorption and the adaptation of a continuous stream of *new* information. That is, the radio forced teachers to assimilate to the consequences of student access to current events. The affordance of access to information would prove beneficial to students while it would penetrate the delivery and content of the curriculum delivered by teachers. Fi... , radio could add authority to a classroom. That is, the radio could validate the claims of the instructor.

Affordance of Representation

The radio enabled teachers to represent the previously unattainable. A large world could be made smaller with the radio. That is, the teacher could bring far away ideas and places to the classroom. Levenson (1945) wrote about the sense of participation the radio provided,

> Listeners who heard George Hicks describe his approach to the fortified Normandy coast saw the invasion through his eyes. They felt his anxiety as the attacking plan neared his small craft and shared the joy of the crew when the bomber was destroyed... The lonely

> fur trapper of the Far North can hear Toscanini's music before the spectators in the rear of the NBC Music Hall can (P. 8, 14).

Educators could utilize this affordance to support and increase their own content expertise as well. Like the information affordance, the current teacher knowledge could be validated by similar claims on the radio. And, teachers could increase their own knowledge through the use of the radio as a learning instrument.

Making knowledge accessible to all fit nicely with the educational ideals of a democratic state. With the radio, the hinterlands of rural America would have an opportunity previously afforded to a few. Moreover, cultural and social events could be represented to further patriotism, cultural pluralism or shear propaganda. Because radio conquered space, it was perceived as a tool to conquer ignorance.

Affordance of Transformation

Radio was professed as an innovation that would transform the standard operating procedures of teaching. The Deweyan movement to change teaching and learning into a child-centered, cooperative, engaging, active process (constructivism) was well underway when the radio was introduced into the classrooms of America. Levenson (1945) stated that the radio could "up grade" teaching skills. Radio's claims included the ability to integrate a Gestalt instruction for children. Radio would be able to amalgamate the learner's experience into her education. Radio claimed to challenge dogmatic teaching. That is, the radio allowed students to question the teacher's point of view. "Other" truths could be heard and discrimination skills could be honed. As a result learning was no longer a passive activity. Darrow (1940) described the importance of the radio in the classroom as, "...a chance to achieve some important educational objectives through practical experiences... Few pupils today profit much from

preparing lengthy essays… they can be taught more English, more public speaking, more acting, more music, and even more pedagogy" (P. 131).

Finally, the adult learners may have benefited from the use of the radios as an educational tool. Darrow (1940) stated, "Man's conquest of his personal problems, in both making a living and in making a life, might come to more men and women if we had such 'radio might schools'" (P. 137). If the reconceptualization of teaching required models, the radio supplied many. Atkinson (1939) stated, "…pedagogically sound conception slowly is beginning to be adopted in the recognition that radio no longer is an awe-inspiring novelty but rather an everyday experience in the home lives of children. The newer conception of classroom use of radio is that programs furnish a desirable emotional experience and at the same time give authentic useful information to the student" (P. 13).

EDUCATIONAL RADIO IN-USE

"The best education is to be found in gaining the utmost information from the simplest apparatus." ~ Alfred North Whitehead

Free, Public Radio

The airways began to fill with educational radio sponsored by universities and colleges as well as entertainment radio funded by for profit corporations. By the mid 1920's over 100 university and college sponsored radios stations were on the air. The high number of educational, university-based stations soon diminished as a result of two economic forces, cost of production and the shortage of consumer power. Because radio equipment was cost prohibited, commercial radios had the advantage of external funding sources. Additionally, the great depression created unemployment and the need for consumers to restrict spending to on staples rather than luxuries like the radio. As a result, only 62 educational stations survived by 1930. By the mid 1930's colleges and universities began to provide larger budgets for radio

programming. At the National Association of Educational Broadcasters held in Madison, Wisconsin in August of 1936, data was collected from participants. A brochure was created in conjunction with the National Committee on Educational by Radio in 1936. The brochure detailed and mapped out the principal educational stations in the United States (see appendix). Arthur Crane stated in the forward, "The record of existing educational radio stations affords evidence that they are providing and will provide in a greater measure a valuable service in the application of radio to the advancement of education and science" (P. 5).

Today publicly funded radio is known only as public radio. Early non-profit or university-sponsored stations were known as Schools of the Air or educational radio. Current WKAR Director Steve Meuche explained the assortment of terms as analogous, "There's no difference. We use the terms interchangeably. Long ago everyone called it educational radio, but at some point the reference changed to 'public' radio. I think it was to leave the impression that it wasn't just stuffy education broadcasts" (Meuche, 2002). In fact, the term educational radio station was reserved and recognized only after the development of frequency modulation (FM) in 1933. The "educational stations" on FM were and still are shielded from commercial sale or use. These non-commercial stations were developed with an outreach philosophy. That is, the aim of such "free" radio was to provide access of information to the previously ignored reaches of rural America. Darrow (1940) stated, "If education is the corrective we think it is, then we should be most concerned about helping those who have the least of it" (P. 116). The university and college charge of the betterment of the community found an efficient vehicle in the radio. Additionally, early public radio was not a threat to commercial radio. Meuche (2002) stated, "Commercial radio has, if anything, gone further away from being non-commercial. The formats are devoid of news and serious information and the FCC has reduced any public service

obligations for commercial stations." While commercial radio also wanted to efficiently provide information over the airwaves, the explicit purpose of commercial radio was instant information and entertainment. As a result, the competing values of selling versus teaching and entertainment versus information did not affect one another. The listenership was aware of the aims of each stations and made decisions based on their needs.

In order to assist public radio, the Federal Radio Education Committee developed a script exchange in October of 1936. This served as a clearinghouse for radio scripts. In all, the exchange provided four main services: radio scripts, production aids, information and idea exchange, and recording. Scripts included the prize winning CBS production of "Americans All-Immigrants All" (US Office of Education, 1938-39). Public radios learned to work together rather than competing with one another like commercial stations. As it is today, particular stations produce programs that are then syndicated to use around the country. In the end, both the purpose and function of public radio was the converse of commercial radio.

Debates were waged in regard to the radio's use in schools. Variety Newspaper celebrated the debates of high school students. A fundamental question was whether radio in the U.S. should look like the government owned and controlled system in England or a consumer, economic based system. "Public tastes and preferences are neglected in England... there is no freedom of speech on British radio as witnessed in the barring of Mahatma Gandhi when in London although his speech was picked up and broadcast in America. [The] American system is sensitive to public criticism because advertising sponsorship makes pleasing the public the first law of broadcasting" (Variety, January 9, 1934, p. 3). This governmental control argument naturally led into questions of the commercialization of radio. In 1934 at the National Committee on Education on the Radio, Jerome Davis of Yale Divinity School stated, "Children

are told that when they drink Cocomalt they are cooperating with Buck Rogers and heroine Wilma… I am not questioning the quality of Cocomalt, but the outrageous ethics and educational effects of this advertising on the child mind" (Spring, 1992).

What the Schools had to Say

William Perry's (1929) collection of data from school personnel in Ohio schools uncovered how administrators paved the way for the utilization of the radio. Paul Brown, Superintendent of Barnesville Schools stated, "Pupils are getting some very good results from these broadcasts, with limited equipment which we have. Our county school for crippled children… so they, too, will be ready to use this new educational device. May the time soon come when each room will be properly equipped with radios as it is with blackboards and windows" (Perry, 1929, p. 30). E.W. Brumbaugh, Principal in Troy, Ohio said, "… Some changes in school schedules were necessary and I believe the sacrifice made will be warranted… We are finding the people in the grades more enthusiastic than the high school, yet you are giving to high school pupils an exceptional program" (Perry, 1929, P. 30). The Perry study also asked teachers about the actual uses of the radio in their classrooms. One teacher detailed a number of affordances of the radio in her classroom, "I think the School of the Air is a good thing, because what you don't learn in school you can hear over the radio. After you have heard a program you feel more wide-awake and can study better. Another thing is if a child is sick and has a radio, he can learn while sick in bed" (Perry, 1929, P. 31). Another teacher identified the diversification of lesson design when she stated, "I think that such a program is very beneficial as it breaks the monotony of every-day class periods" (Perry, 1929, p. 33)[7].

[7] An interesting side note in Cuban's (2001) work was the discovery of teachers using technology to "take a break" from teaching.

Sample Schedules, Programs and Lesson Plans

Ben Darrow[8], Founder of the Little Red Schoolhouse of the Radio, was a pioneer in the development of programming for educational radio. Originally, Darrow found application of the radio in the following subject areas: music appreciation, geography and travel, literature and English, health and hygiene, history, current events, and civics and citizenship (Darrow, 1940). By 1929, educational stations were providing up to an hour a day of instructional programming. A sample of the programming schedule of the Ohio School of the Air provides an insight to the Darrowian ideals of educational radio.

Monday

1:30-1:33	"America the Beautiful," played by organ, (Pupils singing in their classrooms)
1:33-1:45	Health; Story Plays and Rhythmics
1:45-2:00	Current Events by Harrison Sayre, Editor of Current Events and other school publications
2:00-2:03	Three minutes of music
2:03-2:30	History Dramalog (Largely of Colonial Period). (A few bars of "America, the Beautiful" as signature).

(Darrow, 1940, P. 16).

Subsequent days had similar schedules. Throughout the week, the health and history lessons would be replaced by lessons on art appreciation, chemistry, and civic government.

Levenson (1945) outlines a set of criteria for teachers to select a radio program as well as detailed considerations one should take before, during and after the broadcast. A list of elements developed by a committee of teachers under the supervision of Normal Woelfel included: time, length of program, teacher objectives, quality of performance, interest, and authenticity (Levenson, 1945, Pp. 152-3). Additional preliminary considerations for the teacher included: accuracy of school clocks, the avoidance of overcrowding and reception in the auditorium and

[8] Darrow also served as the Director of the Ohio School of the Air for 9 years.

correct turning[9] (Levenson, 1945, Pp. 156-7). Teachers were also encouraged to model appropriate listening skills during broadcasts. Levenson believed that few restrictions should be given to students during the listening period. In fact, he cautions the teacher "to think that the child is listening only when he or she is looking straight ahead at he loudspeaker. Some children do their most effective listening while they are seemingly gazing or merely drawing figures" (P. 163). In regard to note taking he stated, "Whether or not it is valuable to take notes during a radio program has not yet been determined conclusively" (Levenson, 1945, P. 165). As a result, Levenson focused his efforts on detailed plans and questions after the listening period. He warned, "By forcing children to accept stereotyped practices in listening, the teacher confuses a physical form with a mental state" (P. 163).

While the effectiveness of educational radio was inconclusive, radios continued to fill the classrooms of American schools. By 1942 30.5 million radios had been produced and 925 AM stations filled the dial. How one college sponsored, educational radio station developed and actualized educational radio will be the focus of the next section.

THE LIMITS OF EDUCATIONAL RADIO

"The most advanced electronic technologies are incapable of turning their worlds of information into mature knowledge, a form of intellectual magic that requires skilled and educated teachers"
~Diane Ravitch, 2001

John Thomas (1932), a district principal in Clippert schools in Detroit and chair of the Radio Committee of the Department of Elementary School Principals, stated,

> Current development is retarded by many factors: Lack of adequate funds for equipment and research, mechanical developments too rapid to keep pace with, stable teaching practice must see more stabilization in radio teaching, advertising and ethics (P. 980).

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[9] Levenson notes that correct tuning of the radio dial would greatly improve the quality of reception. Levenson states, "The knob should be turned until the pointer indicates the frequency of the desired stations. The rotation should be continued until the program becomes indistinct and then the same operation continued in the opposite direction" (P. 157).

He went on to pose a number of questions in regard to radio's usefulness in schools,

> What are the values of indirect teaching afforded by radio programs? How shall we change our teaching to make better use of radio? May courses of study be constructed to permit the inclusion of teaching by radio? What contributions can teachers, children and principals make to the programs? What sort of preparation shall the teacher make for the program? When television is perfected, will it outmode procedures and equipment determined under present conditions (P. 980)?

He concluded by stating,

> The degree and rapidity of the development will be determined largely by the interested and carefully controlled activities of teachers themselves (P. 980).

While the affordances of the radio were obviously plentiful to non-educators they were painfully arduous for practioners. Woelfel and Tyler (1945) stated, "It is clear that radio has not been accepted as a full-fledged member of the educational family. Radio is still a step child of education..." (P. 2). Two studies were investigated that provide insights to the non-use of radio in schools. First, Armstrong Perry's (1929) work with Ohio schools provides a great deal of qualitative insight from teachers and administrators. William Levenson's (1945) description of the joint study of the FCC and the Bureau of Educational Research at the Ohio State University evaluated the radio broadcasts in the nation's classrooms proved qualitatively valuable. As a result of reviewing both studies, the following barriers were identified: psychological, equipment, skills and knowledge, and curricular.

The psychological barriers to the inclusion of radios in the classroom were bound to the institution as well as the individual. For the institution, changing the form of schools was a great disruption to the grammar of school (Tyack & Cuban, 1995). The establishment of a "way of doing things" was recognized early on in schools. The Durkheimian philosophy in which everything has its place or as Clausse (1949) observed, "Like all institutions, a degree of conventionality has grown up, springing from habits of thought and action, and engraving those

habits in the character of its servants" (P. 54). For the individual, a new pedagogy was asked of them. Finally, for the learners, the radio was criticized as dehumanizing. Spontaneous quests are impossible, humor is less appreciated, invention of new ideas is more difficult, suggestibility is enhanced, and listening becomes an impersonal, passive task. The psychological barrier may have created a paradox of a listening machine with a child-centered pedagogy. Levenson (1945) stated, "Even with radio, the telling method is not real teaching... the best way to teach... is in a number of ways" (P. 23).

Levenson (1945) believed that effective use of the radio in the classroom required that "the teacher know how to turn a receiver properly and use a playback machine correctly" (P. vii). While a sound knowledge of the mechanical use of the radio was necessary, the most crucial skill a teacher needed to utilize the radio in the classroom was content knowledge. Clausse (1949) adamantly stated, "The teacher must not seat himself as a pupil at the feet of school broadcasting. If he wishes to derive profit for his class... he himself must know the subject and content, and himself have secured full information on his own account" (P. 57).

Finding a place in the curriculum was an additional obstacle teachers faced. Lower grades had better implementation of radio because "[secondary teachers] self-reliance and pride of mastery- less willingness to accept help.... Administrative difficulties with complicated schedules... [And] a schedule packed especially with extra-curricular activities" (Darrow, 1940, p. 108-09). Finally, the implementation of a new innovation requires curricular time and follow-through. Without this the innovation lost its effectiveness and even its raison d'etre as an educational medium (Clausse, 1949, p. 48).

A teacher in Perry's study of Ohio schools said of the integration of the radio, "I think such programs as these to be absurd, giving little or no real information, and filling the time with

glittering generalities. They are excellent for getting out of work, but the educational value is nil. What their speakers say is usually known to every intelligent person, can be learned far better in the regular school work and can in no case properly supplant real personal instruction" (Perry, 1929, p. 33).

The national study of educational use of the radio 15 years later qualified the teacher's sentiments. The results proved an indication as to why teachers were not using radio in the classroom (Levenson, 1945, Pp. 203-06; Cuban, 1986, P. 25):

- 50% no equipment
- 23% schedule difficulties
- 19% unsatisfactory equipment
- 14% lack of information
- 11% poor reception
- 11% not related to curriculum
- 10% class work more valuable
- 7% teachers not interested

In the end, overly optimistic backers coupled with the institutional and individual barriers previously mentioned spelled disaster for education by radio. Without attention to the institution's history and the current feelings of the individuals, "the machine itself, however brilliant an achievement it may be, will have little value unless it is used judiciously...Undue use of these devices may 'dehumanize' what is basically a human relationship" (Levenson, 1945, p. 462-3). Similarly, for radio education to take root it needed to be embedded into the curriculum. Radios must be "related to a particular item, pressed into service for a particular purpose. All this requires a great expenditure of intelligence and imagination" (Clausse, 1949, p. 55). In isolation, radio broadcasts are passive and suggestive rather than active and instructive (Clausse, 1949, p. 14). The next section of the paper provides an account of educational radio in use at WKAR in East Lansing, Michigan.

EDUCATIONAL RADIO IN-USE: THE STORY OF WKAR

The story of WKAR will be told in four parts: the creation of WKAR in the 1920's; WKAR during the golden age of radio in the 1930's; the beginning of the end of educational radio in the 1940's; and, WKAR today. Furthermore, three specific programs produced by WKAR will be explored: the Special Courses by Radio (1920's) the Radio School of Biology (1930's) and the Adventures in Music (1940's).

WKAR in the 1920's: The Birth of WKAR & the Special Courses by Radio

While WKAR is the third oldest radio station in the State of Michigan, it is heralded as the state's first educational station. WKAR's first broadcast was heard on May 13, 1922. A 15-minute Founder's Day speech was given by Michigan Agricultural College President David Friday. On August 18, 1922 the Federal government officially licensed WKAR. The station began as an experimental project by novice electrical engineering students in Olds Hall. While serendipitous circumstances may have led to the first broadcasts of WKAR, the determination of East Lansing as its home base was more logically decided. East Lansing, Michigan was chosen as the site because "Michigan is the second largest state east of the Mississippi River, with an area equal to that of England and Wales combined… It is farther, air line, from the southwest tip of Michigan to the tip of the Keweenaw Peninsula in the Upper Peninsula than from Lansing to Washington, D.C." (WKAR, 1940). More specifically, in the 1920's East Lansing was within 100 miles of 86% of the total population[10] of the state and 70% of the total farms[11] (WKAR, 1940).

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[10] 4,000,000 in the 1920's (WKAR, 1940).

[11] 196,000 in the 1920's (WKAR, 1940).

Originally, a 250-watt transmitter on 834 kilocycles powered WKAR. The call letters WKAR have no other significance that being randomly assigned by the government. By 1925 WKAR was transmitting at 1000 watts (WKAR, 1940)[12]. Early functions included providing weather reports for Michigan Airmen. In 1924, MAC moved WKAR out of the bathhouse of the Armory[13] and provided WKAR with space on the top floor of the new home economics building. Additionally, Jimmy Hasselman may have been the first play-by play sportscaster in America when he called the MAC v. Mt. Pleasant Normal School basketball game in January of 1924 using a telephone in the bleachers (Hughes, 1998)[14]. In 1925 WKAR offered a number of instructional courses including the farm services hour (noon daily) and the Farm Radio School began providing agricultural courses by radio. The Farm Radio School was the first of its kind in the country.

During the first semester of 1925, the Farm Radio School included nightly educational broadcasts in five areas:

- Home economics
- Animal husbandry, poultry and veterinary medicine
- Horticulture and gardening
- Dairy husbandry
- Farm crops (MSC, 1925)

The success of the Farm Radio School in 1925 and 1926 led to the expanded Special Courses by Radio. WKAR grew as MAC began to see the potential to foster relationships with the general public. The Special Courses of Radio (1926) stated, "During 1927 the Michigan State College is undertaking a much wider service to the people of the state… It is the hope that

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[12] That same year Michigan Agricultural College became Michigan State College of Agriculture and Applied Science.

[13] The music building now stands in place of the Armory.

[14] MAC 21 MNS 20.

before the close of 1927 the opportunity for a continuing of education may be real to any one in the state, regardless of isolation, distance from schools, lack of early educational opportunity, or other handicaps of location or occupation" (P. 3). The 1927 Special Courses Guide went on to proclaim, "During sixteen weeks, 32 courses totaling 320 lectures will be given by 124 men and women representing 20 departments of the college" (P. 3). The WKAR broadcast schedule from January 10 to April 29, 1927 included daily time for the Special Courses by Radio:

Mondays-	Noon	Weather forecast and market reports
	7:00 p.m.	Farmerkins Stories
	7:15 p.m.	Special Courses by Radio
Tuesdays-	Noon	Weather forecast and market reports
	7:15 p.m.	Special Courses by Radio
Wednesdays-	Noon	Weather forecast and market reports
	7:15 p.m.	Special Courses by Radio
	8:00 p.m.	Musical Hour
Thursdays-	Noon-	Weather forecast and market reports
	7:15 p.m.	Special Courses by Radio
Fridays-	Noon	Weather forecast and market reports
	7:15 p.m.	Special Courses by Radio
	8:00 p.m.	State Department Program
Saturdays-	Noon	Weather forecast and market reports

Seven home basketball games were also scheduled for broadcast in the program (MSC, 1926).

An example of a special radio course offered at MSC was "Muck Farming" sponsored by the Soils Department. The course description states, "This series of talks is arranged for the purpose of giving the latest information regarding the best methods of farming muck soils… The management of muck land from the first breaking up of the swamps to the fertilization and handling of the most specialized crops" (P. 7). The class could be heard every Monday at 7:35-

7:45 p.m. from February 7 through March 7. Professor P.M. Harmer would speak to the topics of:

- Making the Muck Patch Pay Its Way
- General Farming on Muck Land
- Onion, Peppermint and Celery Growing on Muck

(MSC, 1926).

Reference material, textbooks or bulletins that supported the radio courses could be purchased "so that the listener may follow the subject more deeply" (MSC, 1926, P. 3). These reference materials were sent free of change if requested.

The hours of operation up until 1928 reached, on average, 7 1/2 hours per week. However, the Federal Radio Commission allowed WKAR to broadcast from sunrise to sunset in 1928. It would not be until the mid 1930's that broadcast hours would dramatically increase.

WKAR in the 1930's: The Golden Age of Radio & the Radio School of Biology

In 1934, Robert J. Coleman became station manager. Coleman was previously employed at WOSU (home of the Ohio School of the Air). Within the first two years of his tenure, broadcasting went from 15 hours per week to 42-50 per week (Michigan State News, 1947). Coleman revolutionized WKAR not only in the addition of time but also substance to the program format of WKAR. Popular programs created in the 1930's that had staying power included:

- The Farm Service Hour
- The Radio Reading Circle (later named the Radio Reader)
- Professor Prophet's Geography in the News
- The Homemakers Hour
- Don Buell's Curtain Going Up (WKAR, 1940).

Additional innovations included the creation of the College of the Air in 1935;[15] play by play of tennis and baseball; high school orchestra concerts; a morning wake up show with Ronald Heath and his glib talk and "sunshine melodies;" and the development of the 1936 the governor's hour each Friday at 4:45 p.m. Finally, in 1937 WKAR received national acclaim for the national broadcast from campus of the "Varsity Show of Pontiac Motor Company" on November 12 that aired on NBC (Parsons, 1972; Michigan State News, 1947; WKAR, 1940).

While Coleman worked at filling WKAR's allotted hours of operation (sunrise to sunset), the federal regulations would not, until this day, revise the code restriction. Even though WKAR's power source reached 5,000 watts by 1939, it was no match for super stations around the country. At night, an AM radio signal bounces off the sky and travels much further. So, stations, like WKAR that share frequencies with the more powerful, clear channel stations[16] must go off the air at sunset and can't come back on until sunrise (Meuche, 2002).

The dramatic changes in programming are apparent in the Broadcast programs. Below the pre-Coleman program is compared to a Coleman era guide.

	Tuesday, November 20, 1934	Tuesday, October 3, 1939
6:00-10:00 a.m.	Dead Air	Music, Market Reports, Spotlighting the News, Dawn Salute, Arlington Time Signals, Farm News Digest, Calendar for the Day, Radio Reading Circle, and the Homemaker's hour
10:00-Noon	Dead Air	Music, What's New in Books, Vocal Varieties, Michigan State Employment Service, American Family Robinson, Spotlighting State News, and the Michigan State Police
Noon-3:00 p.m.	Weather and market reports, Fruit and Vegetable Farm Flash, Current Poultry Problems (Dept. of Poultry Husbandry), music, Using Cranberries in your Menu	Farm Service hour, Michigan State Department of Conservation, music, Social Security Board program, The Vagabond Poet, and the English

[15] Broadcasts of the College of the Air were heard directly from MSC classes. College credit was *not* given for participation in these courses.
[16] 870 is also occupied by super station WWL in New Orleans

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	(Dept. of Home Economics), Guidance in Smaller Schools (Dept. of Education), and Economic Trends in Agriculture (Dept. of Economics).	Department Program.
3:00-5:00 p.m.	Dead Air	Music, Michigan Education Association Program, Tea Time Harmony, Listen to the Band, Summary of the Day's News, and the Day's March.

(WKAR, 1934; WKAR, 1939)

During the early 20th century most schools had five departments of biology: botany, entomology, zoology, physiology, and bacteriology. This was the case at Michigan State College in the 1930's. Atkinson (1942) rationalized, "The theory was that no teacher of biology could possibly be a specialist in all of these fields" (P. 61). Michigan State College created the Radio School of Biology in an effort to team the five disciplines of biology. That is, a radio course was created around a single topic that would be taught from the five distinct dimensions from five separate instructors. The course titled, "The Man and His Environment" was taught each Thursday from October 10, 1935 to May 28, 1936 at 2:30 p.m. The instructional booklet provided with the course included 30 lessons that were to be completed after each lesson on the radio (see appendix). Each lesson provided a lesson title, instructor and a series of questions WKAR, 1935). Lesson number 20 with professor J.W. Stack was titled, "Song Birds and Man." This particular lesson was provided by the Zoology Department and asked such questions as "How may water birds plant seeds" (WKAR, 1935, P. 20)?

WKAR in the 1940's: The Beginning of the End of Educational Radio & the Adventures in Music

In 1940 WKAR moved its studios from the noisy Home Economics Building[17] to the newly constructed Auditorium. After seven changes in frequency, In 1941 WKAR operated at its current frequency of 870 kilocycles. The daily program guides in the 1940's closely resemble

[17] Numerous documents mentioned the dissatisfaction with the Home Economics building. Apparently the studio was located near a noisy elevator.

the guide from 1939 previously described. However, the 1940's ushered in Sunday programming from 1:00 p.m. to 6:00 p.m. (WKAR, 1946). Agricultural programming still dominated the programming (17% in 1947), but the 1940's also saw many programming changes at WKAR. In 1943 the associated press (AP) service added 5 minutes of newscasts on the hour. Additionally, throughout the decade, time was provided to state and federal agencies promoting the U.S. war effort. Finally, in 1948 the FCC granted WKAR a frequency modulation (FM) station. Using the same call sign of WKAR, the FM station broadcast at 90.5 MHz with a duplicate program as its AM sister station. The FM station was allowed to broadcast after dark and did so with additional programming[18].

The popularity of the rural school music program symbolized the decade for WKAR. The purpose of bringing music to rural schools was "to bring progressive teaching ideas into the ordinary rural schoolroom. One of the chief aims is to encourage teachers and pupils to adapt materials, already in their hands, in intelligent correlation with music" (Michigan State College, 1942, P.3). Each lesson incorporated music into five parts: informational, Victrola Records, reading correlation, pictures and activities. The May 18, 1943 lesson was entitled "American Folk Songs." The informational portion provided two pages of text about folk songs. It concluded, "Only a few of the many types of folk songs found in America can be considered in this broadcast. They are: (1) Songs of the mountaineers (2) Negro songs (3) Cowboy songs and (4) Songs of Stephen Foster" (MSC, 1942, P. 30). The songs and Victrola Records sections named songs to be sung and catalogue numbers for records to be used. Reading correlations included Carl Sandberg's "The American Songbird" and Jules Verne Allen's "Cowboy Lore." For this lesson, the picture offered was "Mammy I Jes' Wants a Chance." Finally, the guide

[18] Mostly music.

offers activities such as "original illustrations by pupils and people in community who may be able to relate personal experiences" (MSC, 1942, P. 31).

In 1945 the Rural School of Music weekly program reached more than 18,000 children. For the 1946-47 season, the show was renamed "Adventures in Music." The show "began each week by a 'Magic (Bell) Ring', which summoned the magician Kisimi, who would explain the wonders of music to Mary and Johnny[19], as well as rural school children statewide" (Hutchens, 1998, P. 9). The program was a staple each Monday morning for elementary students in the greater Lansing area. While its weekly listenership rose to 50,000 a week, 8,000 elementary school children had the opportunity to see Kisimi as part of a live studio audience (Hutchens, 1998). The teacher's guide that accompanied the radio program was modified along with its namesake. The plan of the program integrated into music-drama, repertoire songs and recognition records (MSC, 1946, P. 5). The music-drama phase of the show allowed Kisimi to introduce and teach students about the story behind the music. The repertoire song was the pupil participation phase. Interestingly, the recognition selections section consisted of five famous musical compositions that would be used thematically throughout the year. For example, the 1946-47 teacher's guide make use of Offenbach's "Barcarolle," Bizet's "Habanera," Wagner's "Pilgrims Chorus," Lehar's "The Merry Widow Waltz," and Beethoven-Kreisler's "Rondino in E Flat" (MSC, 1946, P. 5). A compilation of these five pieces was used at the end of each program.

WKAR Today

By 1965 WKAR-FM began a separate programming schedule from WKAR-AM. And, with the increase to 125,000 watts of power, WKAR-FM became a powerful broadcast station in

[19] Child actors played Mary and Johnny.

the State of Michigan. The 1960 also bid farewell to shows the *Homemaker's Hour* in lieu of the emergence of shows produced by the School of Human Ecology. New topics included career opportunities for women (Ecologue, 1995). In 1971 both WKAR and WKAR-FM became affiliated with National Public Radio (NPR). The move to join the NPR family was chiefly economically motivated. The partnership allowed programs and costs to be shared (Parsons, 1972). However, the WKAR stations entered into a new phase, seeking funding from private donations. WKAR moved into the state-of-the-art Communications Arts Building in 1981 where it currently is housed.

Current station director Steve Meuche was asked about programming restrictions and this move over time away from educational radio toward public radio. He stated,

> Early on, public stations were fully funded by their institutional licensees. So, WKAR could do any programming it wanted because we didn't need contributions from listeners to support the stations and we didn't care about how large the audience was. As public radio evolved, with national networks and declining institutional support, the stations focused more on still being an alternative but wanting to at least have a reasonable size audience. And, we began raising money from listeners. So, yes, it caused a format shift to being more "popular" while still being different from commercial stations. (Meuche, 2002)

The March 2002 WKAR radio program guide shows a number of local talk show hosts as well as national programs from National Public Radio. New weekend shows include *Car Talk, Savvy Traveler,* and *Wait, Don't Tell Me* (WKAR, 2002). Fascinatingly, the program that airs each morning at 8:30 a.m. on weekdays, *Radio Reader*, survived all of the changes at WKAR throughout the 20th century.

As usual, WKAR 870 AM will sign off at 6:45 p.m. tonight. In a few months that time will be extended as the summer months bring more daylight. Although the hours of operation and the style of programming changed from throughout the 20th century, today as in the 1920's WKAR's purpose is to extend entertaining education to those near and far.

CONCLUSION

Thus their failure with the rank and file was almost as pronounced as their success with self-selected groups who had been their audience. ~ Benjamin Darrow, 1940

Like most innovations, the radio did not destroy current educational practices. Rather, for some, teaching and learning were changed to unleash the potential of the new medium. Film (1910's-1940's), radio (1920's-1940's), TV (1950's-1980's) and now computers have all traveled a cycle of high expectations for reforming schools, rich promotional rhetoric, and new policies that encouraged availability. Sadly, all of these innovations resulted in little classroom use. The main reasons provided stem from inaccessibility and incompatibility. As a result, the technology is used to maintain existing practices. Cuban states, "teachers continue to see the computer as an add-on rather than as a technology integral to... instruction" (Cuban, 2001, P. 164). Teachers frequently use teaching tools that are reflexive with the needs of both the students and teachers. Cuban (2001) believes technology in schools is integrated as a "slow revolution." A "real" revolution will necessitate a technology that is versatile like a chalkboard; interactive like a conversation; and reflexive like an individual teachers' lesson plan. Only when this type of innovation is implemented in a generative manner will a revolution have a chance to be realized. Chalkboards and textbooks are simple and efficient tools for teachers. They capture the importance of versatile and adaptable tools. Chalkboards- can write, draw, erase, and keep material for days. Philip Jackson writes, "Given this flexibility it is no wonder that the chalk-smudged sleeve has become the trademark of the teacher" (Jackson, 1968, P. 6).

Cohen (1988) stated, "Changes in publishing that made cheap books widely available was an early case: The paperback revolution was announced as a way to free students and teachers from texts, lectures and recitations to which they had been chained since McGuffey" (p. 232). Cohen goes on to say that whenever a newest new technology is introduced, the older new

technologies are left in the shade. Howard Segal (1996) states that these "newest new" technologies are closely coupled to our democratic society,

> The sheer abundance of information is naively equated not only with equal access to it but also with the advancement of both genuine knowledge and genuine democracy. The traditional American rhetoric that has been repeatedly invoked to promote canals, steamships, trains, telegraphs, telephones, radio, television, automobiles and planes is articulated once again as if for the first time: technology and democracy go hand in hand in a reciprocal relationship, and every citizen will benefit equally from that relationship (p. 44-5).

In a time when a vocational education was required and cultural pluralism was desired, radio found a useful niche in the educational market. The introduction and use of the radio in education and in society as a whole had a deep yet short impact. While the radio had a short blip on the radar screen, the radio has a storied use, an expressive purpose and an enduring value.

Today the introduction of computers has similar rhetoric as the radio did previously. Fascinating are the similarities in terms of its actualized hybridization and conceptualization rather than the claim reconceptualization (Cuban, 2001). In the end, the radio's use for efficiency and entertainment remain the function of new technologies today writ large and small. Interesting will be the study of the computer and its impact on classrooms a century from now. William Paley words of warning over 50 years ago should be heeded by education technophiles today, "Experience has taught us that one of the quickest ways to bore the American audience is to deal with art for art's sake, or to deify culture and education because they are worthy gods" (Spring, 1992, P. 105).

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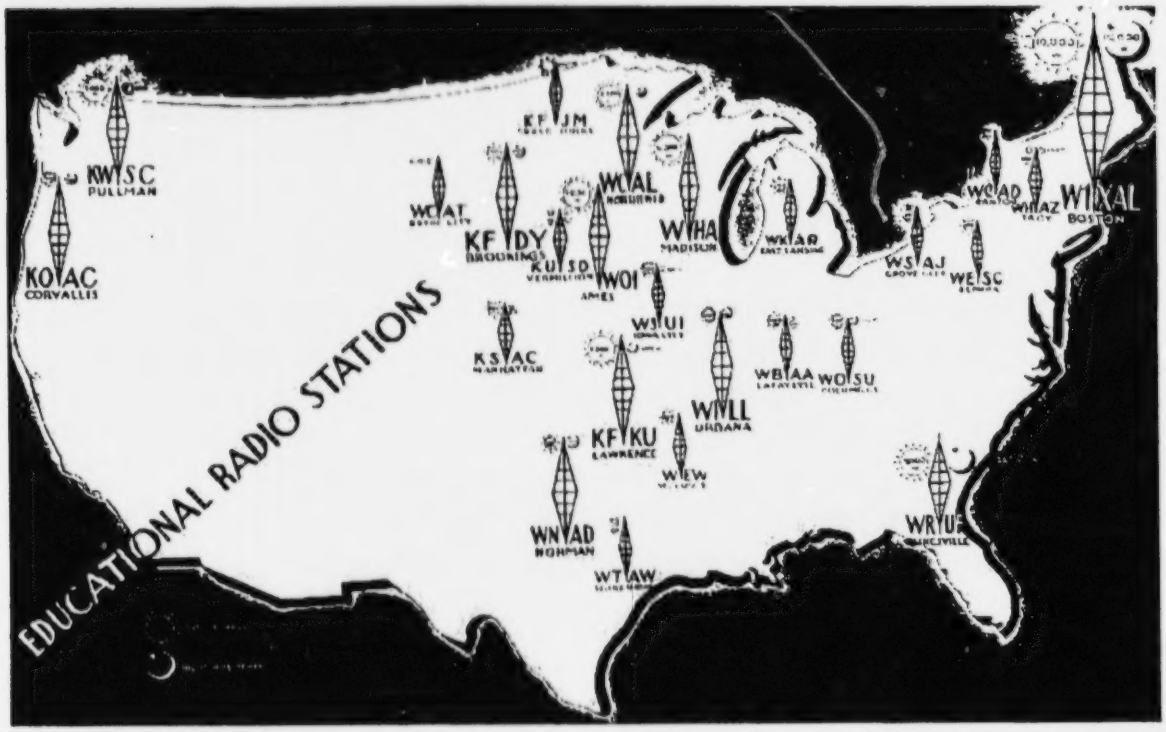
APPENDIX

Primary Educational Radio Stations in 1935
(National Committee on Education by Radio, 1936)



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Sample Commercial Radio Programming in 1939
(Spring, 1992)

AM	Breakfast variety program
Day	Soap operas
Afternoon	News/sports
Evening	Family programming
Night	Drama and music
Sign Off	

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Pictures of Educational Radio in Use
(From WKAR Collection)

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Sample Lessons from the Radio School of Biology

20

WKAR Radio School of Biology, 1935-36

"Man and His Environment"

*****

Lesson No. 20 March 12, 1936

Subject: Song Birds and Man

Speaker: Associate Professor J. W. Stack, Department of Zoology

---

Answer the following questions in the space provided.

1. "Relation of Birds to their Surroundings"

   1. For what three important purposes do birds use their wings?

   2. How do water-fowl escape from eagles, hawks, and fish?

   3. If every Robin would raise five young each year how many would there be at the end of 20 years?

   4. Why is the Crow so common and widely distributed?

   5. How may water birds plant seeds?

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25

WKAR Radio School of Biology, 1935-36

"Man and His Environment"

*****

Lesson No. 25 April 23, 1936

Subject: Insect Influences on Man

Speaker: Professor Ray Hutson, Department of Entomology

Answer the following questions in the space provided.

1. What is the most important way in which insects affect man?

2. Name the regions of the world where mosquitoes cause most trouble.

3. Where do mosquitoes always spend their larval stages?

4. Why are the tropics sometimes called "the white man's graveyard"?

5. How do people combat insect borne diseases?

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WKAR-AM and WKAR-FM Programming 1957

1957 report classified programming for the AM at 78:45 hours while FM was 97:30 hours.

	AM	FM
Entertainment	42.5%	47.2%
Religion	2.3%	1.7%
Agriculture	14.8%	12.6%
Education	19.4%	17.2%
News	9.5%	9.0%
Discussion	2.3%	2.8%
Talk	9.5%	9.5%

(MSU, 1957)

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Photo of the Live Performance of Adventures in Music, 1946

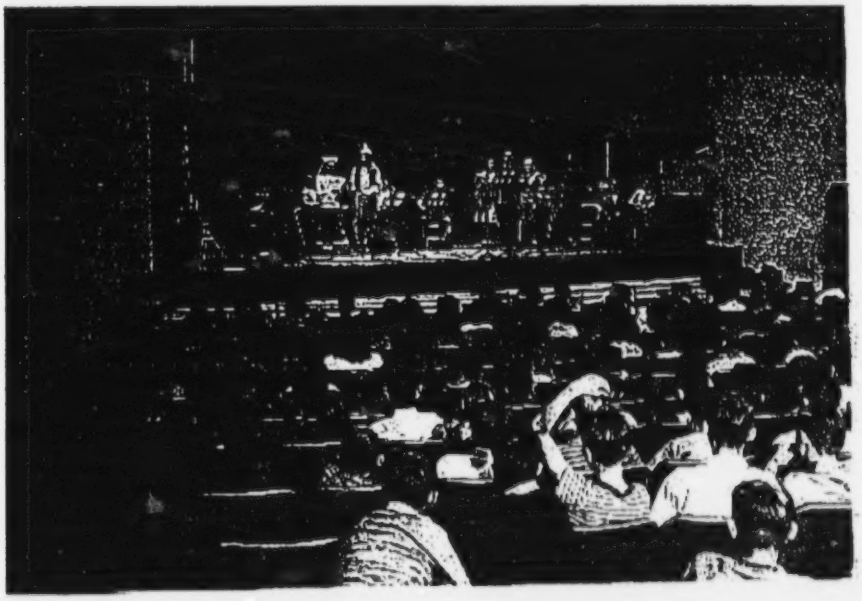

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Photo of the Kisimi, Johnny and Mary in Adventures in Music, 1946

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